# IDAHO
# DEPARTMENT OF FISH & GAME

Jerry M. Conley, Director

RAPID RIVER HATCHERY

ANNUAL REPORT

IPC - 17 Evaluation of Spring Chinook Salmon Emigration, Harvest and Returns to Rapid River Hatchery, 1981.

IPC - 13 Report of Operations at Rapid River Hatchery, 1981.

Period Covered: October 1, 1980 - September 30, 1981

by

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# Rapid River Hatchery

## ABSTRACT

During the period from 1 October, 1980 to 30 September, 1981, approximately 2.4 million chinook smolts were planted into Rapid River from the 1979 brood. An additional 1,001,700 smolts were hauled to the Snake River and planted directly below Hells Canyon Dam in March, 1981.

On 1 October, 1980 approximately 1.7 million eggs were on hand from adults spawned in August and September, 1980. The resulting fish, nearly 1.5 million, were moved from the fry raceways to one rearing pond in May, 1981. We prevented normal migration loss in the pond with the use of solid screens in our pond divider system. Due to this low fish number, no fish were scheduled to be planted in the Hells Canyon area next spring.

Net production from this hatchery, for the fish year, was 57,884 lb (26,251 kg). We fed 95,950 lb (43,515 kg) of Oregon Moist Pellet feed for a total cost of $35,212.55. The resulting feed conversion was 1.66:1. The fish feed cost for each pound of fish produced was $.608 ($1.60/kg).

The upstream migrant trap was installed n 31 March, 1981 and was operated through 17 July. Fish classed as spring chinok entered the trap from 6 May through 16 July totaling 3,263. The trap was taken out of operation on 17 July and no attempt was made to enumberate summer chinook adults. The peak -f this year's salmon run occurred during the week of 16 June. Other species entering the trap this season included steelhead, Dolly Varden, rainbow, cutthroat and whitefish. No rough fish were observed.

The age-class composition of chinook entering the Rapid River trap showed 176 three-year-olds (jacks) or 5.4%; 2,945 four-year-olds or 90.2%; and 142 five-year-olds or 4.4%. The run total, 3,263, was comprised of 1,275 males, 1,812 females and 176 jacks. All chinook adults were held for spawning. Chinook returning to Rapid River made up approximately 5% of the Bonneville Dam and 24% of the Lower Granite Dam count.

All fish arriving at the trap were examined and measured. Fish showing symptoms of Nitrogen Bubble disease totaled 211 or 6.4%. We observed 212 fish or 6.5%, with gaff wounds; 239 or 7.3% with gillnet damage; 6 fish or .2% with hooking wounds; and 146 or 4.5% classified as "other injuries." All noted injuries were significant this year, occurring on approximately 25% of the run. Mortalities at the trap facility totaled 45, which made up a sizeable percentage of all adult losses this year. Throughout the trapping, holding and spawning season, 66 males and 146 females were classified as trap or pre-spawning mortalities (6.9%). This mortality figure is near a record low for this hatchery.

Adult chinook arriving at the trap, totaling 2,897, were administered drug injections of Erythromycin as part of a continued study of kidney disease. A control group of 190 uninjected fish were used to evaluate this project. Also, University of Idaho personnel collected samples of organs, blood, etc. throughout the spawning season. Complete research results are not available at the time of this report.

Spawntaking operations commenced on 3 September and were completed on 17

September, 1981. A total of 1,666 females were spawned to produce approximately 6.1 million eggs. Nearly all females were four-year-olds producing an average of 3,675 eggs per female. The eggs this season averaged 100/ounce (3.53/ml), and were water hardened in a 2ppm solution of Erythromycin. The season eye-up totaled 93.6% this year. All eggs were treated with Malachite Green during incubation for fungus control. This season, approximately 1.5 million excess eggs will be available for other hatcheries.

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## OBJECTIVES

1. Evaluate brood year returns of spring chinook salmon to Rapid River Hatchery.
2. Inventory other fish species entering the trap facility.
3. Report all functions and operations of this hatchery during the fish year.
4. Report the distribution of fry, fingerlings and smolts from this hatchery.
5. Estimate sport harvest, if any, of salmon from Rapid River Hatchery taken in the Salmon River drainage.
6. Report all improvements, list needed modifications and record public relation items accomplished during the year.

## INTRODUCTION

Rapid River Hatchery is located near Riggins, Idaho in Region Two. This facility is owned and financed by Idaho Power Company for the purpose of rearing and releasing approximately three million juvenile spring chinook salmon annually. The water source for all hatchery functions is Rapid River, a tributary to the Little Salmon River.

The hatchery project includes an adult trapping facility, several adult holding ponds, two earthen rearing ponds and twelve concrete raceways. Structures include an incubator building for 50 double stacked Heath incubators, an office-shop complex with additional storage areas, public restrooms, three permanent residences, and several mobile trailer units for temporary housing.

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## TECHNIQUES USED

### Marking and Evaluation of Downstream Migrants - 1979 Brood

During February 1981, approximately 147,000 juvenile chinook were marked by personnel with the use of the Department of Fish and Game mobile tagging unit. All marked fish carried a coded wire tag and an adipose fin clip.

### Upstream Evaluation of Fish Species and Numbers

The upstream migrant trap was operational from 31 March through 17 July. During this period, all fish species were examined and recorded daily at the trap facility. Records were kept of all tags, injuries and length measurements were taken from all chinook to assist age-class determination. All spawntaking and research return data were recorded throughout the spawning season.

### Conversion Rates

All feed and fish growth information from hatchery records was used to determine conversion rates.

### Harvest Information

No sport fishery was allowed on chinook salmon this year, due to the low number of salmon entering Idaho. Nez Perce tribal fishing again contributed to the lower numbers of salmon arriving at the trap on Rapid River. An accurate estimate of the Indian harvest is not available at this time.

'Summer Chinook Enumeration

In past years, chinook adults arriving after approximately 30 July were classified as summer chinook. This season, the trap was taken out of operation on 17 July and no attempt was made to evaluate summer chinook numbers. However, approximately 200 adults were counted on or near the hatchery property. Some of these fish contained coded wire tags leading us to believe that most of these fish might be spring chinook stock.

## FINDINGS

### Spring Chinook Smolts - 1979 Brood Year

#### Enumeration, Marking and Evaluation of Downstream Migrants

Smolt plants in Rapid River from the 1979 brood year totaled approximately 2,372,607 during the fish year. These fish averaged 136.0 mm in length and 17.9 per lb (39.5/kg). An additional 1,001,700 smolts from this brood year were planted below Hells Canyon Dam on the Snake River in March, 1981.

During February 1981, the tagging crew marked approximately 147,441 pre-smolts with an adipose fin clip and coded wire tag. Approximately 95,000 fish from this group had been kept in raceways to be used for a Vibrio vaccination experiment prior to marking. These fish averaged 28 per lb at marking time. Another group of 52,746 fish from the rearing pond was also marked in February. These fish averaged 14.8 per lb and represented the normal hatchery release. All marked pre-smolts were held in the hatchery drainage canal for nearly two months prior to release. Tag retention was approximately 98.5% for all release groups.

Smolt emigration from the hatchery appeared to start during the first week of April, 1981. A final pond flush on 11 April forced all remaining smolts out of the system. This season, all pond lights were turned off in early January in order to ensure a normal photo period for at least 6 weeks prior to the normal emigration time.

#### Rearing Problems - Diseases and Treatments Used

During the fish year, disease losses on the 1979 brood smolts were low, although minor incidences of "Coldwater" Disease were noted during the winter months when water temperatures remained near 40° F. Control measures using Malachite Green prevented a major disease outbreak.

#### Conversion Rates

Net production for the fish year was 57,884 lb (26,251 kg). A total of 95,950 lb (43,515 kg) of Oregon Moist Pellet fish feed was used to obtain this production. The resulting conversion rate was 1.66 lb of feed for 1 lb of fish produced.

### Spring Chinook Juveniles - 1980 Brood Year

#### Enumeration

On 1 October 1980, approximately 1.7 million eggs were on hand in the incubators at Rapid River Hatchery. These originated from Rapid River adults spawned during August and September 1980. The resulting fry, nearly 1.5 million, were all transferred to the raceways by 26 January 1981. We monitored temperature units during egg

incubation and determined that newly emerged fry would start on feed between 1,550 and 1,650 temperatures of development. The loss percentage from eyed eggs to fish placed in the raceways was 2.5%.

During the first week of June, 1981, approximately 1.4 million fingerlings were transferred from the raceways to rearing pond number two. Due to the low number of smolts on hand, no fish will be available for distribution to other areas next spring.

Rearing Problems - Diseases and Treatments Used

Due to the low number of 1980 brood smolts, all fish were contained with fixed screens in the upper half of rearing pond number two. The self-cleaning pond screens were not used, therefore, eliminating the problem of normal summer emigration from the ponds. We anticipate using large diameter powered screens in both rearing ponds next season to help maintain an accurate fish inventory.

Prior to ponding, some mortality losses were experienced on fish from this brood year from unknown causes. This unknown mortality has been tagged the "Spring Thing" and seems to cycle here each year on fish 400-600 per lb when water temperatures climb near 43° F. The exact cause of this problem is still unknown, which has prompted a research project scheduled for next spring. No major disease problems were experienced on these fish after they were ponded although-a minor incidence of "Sunburn" was noted. Treatments with Cutrine and Malachite Green provided some control.

Spring Chinook Adults - Returns to Rapid River, 1981

Duration of Run

Chinook salmon classed as spring run fish entered the Rapid River trap from 6 May through 17 July 1981. The peak of the run occurred during the week of 16 June when approximately 2,000 fish were counted.

Enumeration

During May, June and July, 1981 3,263 chinook salmon were counted at the trap on Rapid River. This included 176 jack (5.4%), 2,945 four-year-olds (90.2%) and 142 five-year-olds (4.4%). Age class composition was determined by lengths and coded wire tag recovery data.

Observations of Injuries to Chinook Returns

Incidences of injuries, approximately 25% of the run (814 fish) were significantly higher than last year. These were classified as gaff wounds (212), gill net (239), hooking (6), nitrogen blisters (211) and other injuries (146). All wounds were treated with a strong solution of Malachite Green applied directly to the wound. Also, injuries due to inadequacies at the trap structure were substantially higher than last year.

Marked Fish Returns

All chinook entering the Rapid River trap were examined for tags and marks. Snouts were taken on all fish having an adipose fin-clip, which were then sent to

the lab for data recovery. In total, 127 fish from Rapid River releases were recovered with coded wire tags. Most of these fish were four-year-olds (123), while the remaining four fish were known five-year-olds. No marked jacks were observed this season.

Also, during the year tag recovery data from approximately 20 Rapid River fish was received from other agencies. This included one fish returning to the McCall Hatchery adult trap, on the South Fork of the Salmon River.

Prespawning Mortality - Treatment of Adults

Prespawning losses at Rapid River Hatchery, due to kidney disease, have been greatly reduced in the past few years due mainly to research efforts by the University of Idaho. Kidney disease, which was once a major source of mortality, has been reduced to a low incidence through the use of drug injections of Erythromycin. This was. administered to 2,897 adults this season, at the rate of 5 mg per lb of body weight. A small group of 190 uninjected fish was used as a control to monitor mortality differences.

During the entire holding and spawning season, nearly every carcass was checked for kidney disease lesions and cuases for mortality. A total of 65 prespawner mortalities were noted to contain kidney disease lesions. Eleven of these fish were from the uninjected group of 190 fish. The remaining 54 fish with lesions were from the injected group of 2,897 fish.

During the egg taking operations, blood and kidney samples were taken from spawners by University of Idaho and Washington State University personnel. Test results on these samples are not available at this time.

The incidence of fish showing symptoms of jaundice was very low this year, only 12 fish. In the past, it was thought that the method of injection was the cause for this condition. By using the "subcutaneous" method of injection this year, the incidence of jaundice was minimal.

Throughout the holding and spawning season, total mortalities were near a record low for this hatchery. Flushes with Malachite Green, which were started soon after fish were ponded, proved effective for fungus control. Prespawning and trap mortality losses this season totaled only 212, or 6.9% of the run. This total was comprised of 66 males and 146 females.

Spawntakinq Operations and Enumeration of Eggs

Spawntaking operations were started on 17 August and were completed on 17 September 1981. A total of 1,666 females were spawned to produce approximately 6,122,273 eggs. Nearly all females spawned this year were classified as four-year-olds, which produced an average of 3,675 eggs per female. These eggs averaged 100 per oz (3.53/ml) this season.

All eggs taken this year were again water-hardened in a 2 pm solution of Erythromycin. This techinque is part of a continuing study of bacterial kidney disease at this hatchery. We feel this is beneficial and plan to continue the use of Erythromycin for water-hardening eggs.

Disposition of Fish Carcasses

During the season, 208 salvageable, noninjected fish, including jacks, were cleaned and packaged for the Nez Perce tribal council. All other spawners and pond

mortalities were stored in a mobile freezer unit to be used later by Fish and Game personnel for a bear research project. Due to the adult injections of Erythromycin, no spawners were given away to the public for human consumption.

### Distribution of Eggs - Eye-up Percentages - 1981

Eggs taken this season totaling approximately 6,122,273 were placed in incubators at Rapid River Hatchery and 93.6% survived to eye-up. Upon eye-up, nearly 1.3 million eggs, excess to our project needs, were available for distribution to other hatcheries.

### Harvest - Sport and Indian Fishery

Due to the low run of spring chinook salmon entering Idaho, it was again necessary to close the season to sport fishing. The Nez Perce Indians did fish on a cooperative basis allowing the hatchery to receive the minimum required number of adults needed for egg taking purposes. The exact Indian harvest number is unknown at this time

## Summer Chinook Adults - Returns to Rapid River - 1981

### Enumeration

All chinook salmon arriving at the trap on Rapid River from 6 May through 17 July, 1981 were classified as spring run fish. At this time, the trap was taken out of operation and no further attempts were made to enumerate summer chinook.

During the next few months, observations were made of approximately 200 salmon on or near the hatchery property. Some of these fish were noted to have an adipose fin-clip and were thought to be from hatchery origin.

## Inventory of Miscellaneous Species in Rapid River

### Steelhead

A total of 79 steelhead were examined at the trap from 17 April through 19 June. Length measurements, marks, etc. were collected from all steelhead prior to their release above the hatchery trap.

### Dolly Varden

During the time the trap was in operation, a total of 134 Dolly Varden were observed. Many fish this year, were in the 18 in (457 mm) size class.

### Other Species

In addition to the species listed above, incidental numbers of rainbow, cutthroat, and whitefish were recorded. No rough fish were observed this year.

## Hatchery Improvements and Maintenance

Some major improvements were accomplished at Rapid River Hatchery during the year. A new incubator building was constructed and the old areas converted into storage buildings. A new office now occupies the old feed freezer room providing us with a more adequate area for record keeping.

Other routine maintenance jobs included pond panel painting, tree topping in the park, and spawning equipment modifications.

Public Relations, Visitors, Etc.

During the year, approximately 2,500 people visited Rapid River Hatchery. This included school groups during the spawning season.

Also, personnel from this hatchery participated in hunter safety classes during the year.

## RECOMMENDATIONS

Project Problems

During the year, some of our facility problems were alleviated with the addition of a new incubator building. Due partially to the location of this new building, we are experiencing problems of low water pressure, which hopefully can be resolved.

Housing for temporary employees still remains minimal and could be improved with the addition of a crew quarters building.

The hatchery intake, pond screening systems and worn out fish feeders still remain a problem.

Modification at the trap facility is also needed to minimize injuries to the chinook salmon.

Research Projects

Kidney disease research by the University of Idaho personnel was again performed at Rapid River Hatchery. Adult injections and water-hardening eggs with formulations of Erythromycin still appear to be beneficial to this project for the control of kidney disease.

Vibrio vaccinations of juvenile chinook are currently scheduled for next February. This experiment will run several years in order to evaluate research efforts.

## ACKNOWLEDGEMENTS

The hatchery personnel from Rapid River Hatchery wish to express their appreciation to Rodney Duke and other coded wire tagging personnel; Dr. G. W. Klontz and his staff from the University of Idaho; Department of Fish and Game enforcement personnel, and the Idaho Power Company maintenance crew.

Hatchery staffing during the year included Thomas Levendofske, Fish Hatchery Superintendent III; Thomas L. Rogers, Fish Hatchery Superintendent I; Jery McGehee, Fish Culturist; Michael Graham, Fish Hatchery Superintendent I; Bruce Schulte and Douglas Burton, Bio-Aides; Ross Clay and Paul Fjosne, Laborers; Robert Christophel, CETA worker.

## LITERATURE CITED

Annual Reports of Rapid River Hatchery, 1964 - 1979.

Table 1. Egg shipments: October 1, 1980 - September 30, 1981.

* No egg shipments were made during this period.

Table 2. Fingerling shipments: (1980 brood) October 1, 1980 - September 30, 1981.

* No fingerling shipments were made during this period.

Table 3. Smolt shipments: (1979 brood) October 1, 1980 - September 30, 1981.

| RELEASE SITE | NUMBER | SIZE | FOUNDS | ( Kg. ) |
|---|---|---|---|---|
| Hells Canyon (Snake River) | 1,001,700 | 21.0/Lb. (46.3/Kg.) | 4.7,700 | 21,635 |

Table 4A. Summary of smolts released into Rapid River.

| Brood Year | Number of smolts Released | Year of Release | Average Length mm | in | Number Per kg | lb | Total Weight kg | lb |
|---|---|---|---|---|---|---|---|---|
| 1964 | 580,000 | 1966 | 121 | 4.8 | 49.8 | 22.6 | 11,630 | 25,64 |
| 1965 | 480,000 | 1967 | 117 | 4.6 | 51.1 | 23.2 | 9,383 | 20,69 |
| 1966 | 1,460,000 | 1968 | 116 | 4.6 | 55.1 | 25.0 | 26,484 | 58,40 |
| 1967 | 900,000 | 1969 | 118 | 4.6 | 52.9 | 24.0 | 17,006 | 37,50 |
| 1968 | 3,172,000 | 1970 | 127 | 5.0 | 44.1 | 20.0 | 71,925 | 158,60 |
| 1969 | 2,718,720 | 1971 | 123 | 4.8 | 46.3 | 21.0 | 58,711 | 129,46 |
| 1970 | 2,809,200 | 1972 | 128 | 5.0 | 42.8 | 19.4 | 56,747 | 125,13 |
| 1971 | 2,908,425 | 1973 | 129 | 5.1 | 37.5 | 17.0 | 79,358 | 174,98 |
| 1972 | 2,707,917 | 1974 | 128 | 5.0 | 38.6 | 17.5 | 69,005 | 152,16 |
| 1973 | 3,373,700 | 1975 | 137 | 5.4 | 32.6 | 14.8 | 105,987 | 233,70 |
| 1974 | 3,546,640 | 1976 | 125 | 4.9 | 40.6 | 18.4 | 87,638 | 193,20 |
| 1975 | 3,170,722 | 1977 | 134 | 5.3 | 35.1 | 15.9 | 90,986 | 200,64 |
| 1976 | 2,413,678 | 1978 | 136 | 5.4 | 33.6 | 15.7 | 69,679 | 153,64 |
| 1977 | 3,018,448 | 1979 | 138 | 5.5 | 33.0 | 15.0 | 97,330 | 214,61 |
| 1978 | 2,811,593 | 1980 | 136 | 5.4 | 33.0 | 15.0 | 85,175 | 187,81 |
| 1979 | 2,372,607 | 1981 | 136 | 5.4 | 39.5 | 17.9 | 52,459 | 115,62 |
| Total | 38,461,850 | | | | | | 989,512 | 181,82 |
| Average | 2,403,866 | | 128 | 5.0 | 41.6 | 18.9 | 61,845 | 136,36 |

Table 4B. Summary of smolts released into Snake River. (Hells Canyon)

| Brood Year | Number of Smolts Released | Year Of Release | Average Length mm | in | Number Per kg | lb | Total Weight kg | lbs |
|---|---|---|---|---|---|---|---|---|
| 1979 | 1,001,700 | 1981 | 133 | 5.3 | 46.3 | 21.0 | 21,635 | 47,700 |

Table 5. Returns of Spring Chinook Salmon to Rapid River Hatchery, survival to spawning, and enumeration of eggs.

| Return Year | Snake R. Returns (adults) | Rapid R. Returns (adults) | Rapid R. Returns (adults) | Mortality Prior to Spawning | Number of Females Spawned | Number of Eggs per Female | Number of Eggs Taken |
|---|---|---|---|---|---|---|---|
| 1964 | 349 | | | 16% | 182 | 4,874 | 887,000 |
| 1965 | 408 | | | 21% | 133 | 4,541 | 604,000 |
| 1966 | 1,511 | | | 18% | 621 | 3,697 | 2,296,000 |
| 1967 | 974 | | 1,039 | 11% | 581 | 3,537 | 2,055,000 |
| 1968 | 351 | 3,416 1/ | 640 | 2% | 1,809 | 3,671 | 6,540,000 |
| 1969 | 672 | 2,817 1/ | 1,043 | 8% | 1,415 | 3,655 | 5,151,697 |
| 1970 | | 6,470 | 887 | 10% 2/ | 3,520 | 4,136 | 14,560,280 |
| 1971 | | 3,357 | 1,754 | 19% | 1,722 | 3,507 | 6,038,785 |
| 1972 | | 12,310 | 943 | 15% | 3,825 | 3,941 | 15,072,604 |
| 1973 | | 17,054 | 286 | 37% | 3,454 | 3,912 | 13,510,465 |
| 1974 | | 3,457 | 538 | 27% | 1,756 | 3,924 | 6,890,186 |
| 1975 | | 4,428 | 573 | 7% | 2,184 | 3,894 | 8,503,606 |
| 1976 | | 6,342 | 1,765 | 15% | 3,055 | 3,762 | 11,492,878 |
| 1977 | | 7,767 3/ | 437 | 11% | 3,781 | 3,745 | 14,160,330 |
| 1978 | | 5,735 | 34 | 21% | 2,350 | 4,266 | 10,026,888 |
| 1979 | | 3,054 | 350 | 31% | 1,141 | 4,950 | 5,648,722 |
| 1980 | | 1,528 | 432 | 30% | 543 | 3,235 | 1,756,827 |
| 1981 | | 3,087 | 176 | 7% | 1,666 | 3,675 | 6,122,273 |
| Total | 4,265 | 80,822 | 10,956 | | 33,738 | | 131,317,541 |
| Average | 711 | 5,773 | 730 | 15% | 1,874 | 3,892 | 7,295,419 |

1/ Adults over the 2,700 holding capacity at Rapid River Hatchery were hauled to Stolle Meadows and to McCall Hatchery

2/ Until 1969, mortality rates were figures on losses prior to the beginning of spawning. After 1969, any fish that had not successfully completed spawning was included as pre-spawning mortality.

3/ Adults over the 8,000 holding capacity at Rapid River Hatchery (7,000 in 1977) were planted in the Little Salmon River, Salmon River, and the South Fork of the Clearwater River.

Table 6. Length frequencies of Spring Chinook entering Rapid River trap, 1974 – 1981. (Fork Length)

| Length cm | in | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|
| 33.0 | 13 | 3 | 3 | 3 | 3 | 1 | 0 | 1 | 1 |
| 35.6 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 38.1 | 15 | 11 | 5 | 4 | 1 | 2 | 4 | 4 | 8 |
| 40.6 | 16 | 27 | 21 | 50 | 12 | 7 | 11 | 19 | 25 |
| 43.2 | 17 | 80 | 93 | 114 | 26 | 1 | 30 | 52 | 47 |
| 45.7 | 18 | 91 | 114 | 311 | 77 | 4 | 61 | 103 | 56 |
| 48.3 | 19 | 75 | 139 | 463 | 115 | 4 | 95 | 120 | 23 |
| 50.8 | 20 | 53 | 114 | 445 | 110 | 2 | 88 | 95 | 14 |
| 53.3 | 21 | 32 | 41 | 233 | 58 | 9 | 39 | 35 | 2 |
| 55.9 | 22 | 59 | 15 | 75 | 19 | 4 | 19 | 18 | 25 |
| 58.4 | 23 | 37 | 31 | 30 | 7 | 16 | 6 | 78 | 54 |
| 60.9 | 24 | 117 | 69 | 40 | 10 | 67 | 7 | 178 | 154 |
| 63.5 | 25 | 70 | 126 | 143 | 84 | 240 | 57 | 311 | 455 |
| 66.0 | 26 | 250 | 377 | 361 | 292 | 655 | 69 | 376 | 772 |
| 68.5 | 27 | 379 | 736 | 869 | 879 | 1,235 | 75 | 298 | 764 |
| 71.1 | 28 | 423 | 1,106 | 1,324 | 1,848 | 895 | 47 | 137 | 428 |
| 73.7 | 29 | 273 | 920 | 1,224 | 2,138 | 512 | 40 | 57 | 174 |
| 76.2 | 30 | 159 | 521 | 858 | 1,221 | 242 | 88 | 25 | 58 |
| 78.7 | 31 | 100 | 187 | 443 | 648 | 238 | 214 | 7 | 61 |
| 81.3 | 32 | 146 | 110 | 232 | 245 | 362 | 414 | 11 | 58 |
| 83.8 | 33 | 260 | 96 | 217 | 122 | 483 | 525 | 10 | 61 |
| 86.4 | 34 | 376 | 77 | 215 | 92 | 458 | 485 | 11 | 58 |
| 88.9 | 35 | 358 | 51 | 176 | 74 | 303 | 455 | 8 | 45 |
| 91.4 | 36 | 298 | 27 | 151 | 38 | 136 | 291 | 4 | 28 |
| 94.0 | 37 | 190 | 78 | 78 | 26 | 63 | 131 | 8 | 6 |
| 96.5+ | 39+ | 131 | 51 | 51 | 37 | 40 | 112 | 2 | 0 |
| Total Run | | 3,995 | 5,000 | 8,170 | 8,181 | 5,769 | *3,361 | 1,960 | 3,263 |

*Total run was actually 3,464 fish with 43 fish that died in the trap which were not measured.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 1972 | 200,000 | Ad-Lan* | 7 | .01 | 54 | .02 | 21 | .01 | 82 | .04 | |
| | 1972 | 2,609,108 | None | 279 | .01 | 1,644 | .06 | 365 | .01 | 2,288 | .03 | |
| Total | 1972 | 2,809,200 | | 286 | .01 | 1,698 | .06 | 386 | .01 | 2,370 | .08 | 1,185 |
| 1971 | 1973 | 201,547 | Ad-an* | 18 | .01 | 233 | .12 | 41 | .02 | 292 | .14 | |
| | 1973 | 2,706,876 | None | 520 | .02 | 3,973 | .15 | 1,079 | .04 | 5,572 | .21 | |
| Total | 1973 | 2,908,425 | | 538 | .02 | 4,206 | .14 | 1,120 | .04 | 5,864 | .20 | 496 |
| 1972 | 1974 | 100,374 | R(lt)** | 0 | .00 | 89 | .09 | 14 | .01 | 103 | .10 | |
| | 1974 | 170,775 | R(rt)** | 26 | .01 | 121 | .07 | 22 | .01 | 169 | .09 | |
| | 1974 | 2,436,768 | None | 547 | .02 | 5,012 | .21 | 598 | .02 | 6,157 | .25 | |
| Total | 1974 | 2,707,917 | | 573 | .02 | 5,222 | .19 | 634 | .02 | 6,429 | .23 | 421 |
| 1973 | 1975 | 343,278 | R(rt)** | 49 | .01 | 272 | .07 | 82 | .02 | 403 | .12 | |
| | 1975 | 3,030,422 | None | 1,716 | .06 | 6,838 | .22 | 1,763 | .06 | 10,317 | .34 | |
| Total | 1975 | 3,373,700 | | 1,765 | .05 | 7,110 | .21 | 1,845 | .05 | 10,720 | .32 | 315 |
| 1974 | 1976 | 136,606 | Ad-CWT* | 9 | .007 | 95 | .07 | 93 | .07 | 197 | .14 | |
| | 1976 | 3,222,334 | None | 428 | .01 | 3,795 | .12 | 2,320 | .07 | 6,543 | .20 | |
| Total | 1976 | 3,358,940 | | 437 | .01 | 3,890 | .12 | 2,413 | .07 | 6,740 | .20 | 498 |
| 1975 | 1977 | 50,475 | R(rt)** | 1*** | .002 | 1 | .002 | 0 | .00 | 2 | .00 | |
| | 1977 | 254,945 | Ad-CWT* | 2 | .001 | 22 | .001 | 14 | .006 | 38 | .02 | |
| | 1977 | 2,865,502 | None | 32 | .001 | 575 | .02 | 32 | .001 | 639 | .02 | |
| Total | 1977 | 3,170,922 | | 34 | .001 | 598 | .02 | 46 | .002 | 678 | .02 | 1,677 |
| 1976 | 1978 | 131,250 | Ad-CWT* | 12 | .009 | 35 | .03 | 4 | .003 | 51 | .04 | |
| | 1978 | 2,282,428 | None | 338 | .01 | 1,147 | .06 | 112 | .006 | 1,927 | .09 | |
| Total | 1978 | 2,413,678 | | 350 | .01 | 1,182 | .06 | 116 | .006 | 1,978 | .08 | 1,220 |
| 1977 | 1979 | 250,200 | Ad-CWT* | 13 | .005 | 123 | .05 | (1982) | - | - | - | |
| | 1979 | 2,616,793 | None | 419 | .02 | 2,945 | .11 | (1982) | - | - | - | |
| Total | 1979 | 2,866,993 | | 432 | .02 | 3,068 | .11 | (1982) | - | - | - | - |
| 1978 | 1980 | 193,237 | Ad-CWT* | 0 | .00 | (1982) | - | (1983) | - | - | - | |
| | 1980 | 2,618,266 | None | 176 | .006 | (1982) | - | (1983) | - | - | - | |
| Total | 1980 | 2,811,503 | | 176 | .006 | (1982) | - | (1983) | - | - | - | - |

Tr.

Table 2. Summary of [illegible] to Rapid River Hatchery, by [illegible] spring Chinook [illegible] released, 1964 - 1981.

| Brood Year | (Smolts) Year of Release | Number Released | Type Mark | Returns (number and percent) by age class 3 yr olds No. | % | 4 yr olds No. | % | 5 yr olds No. | % | Total No. | % | No. of Smolts per Ad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1964 | 1966 | 51,181 | LP* | 76 | .15 | ? | ? | ? | ? | ? | ? | |
| | 1966 | 536,820 | None | 983 | .18 | ? | ? | ? | ? | ? | ? | |
| Total | 1966 | 588,000 | | 1,059 | .18 | 3,422 | .58 | 197 | .03 | 4,678 | .79 | 1: |
| 1965 | 1966 | 14,500 | RI* | ? | ? | 13 | .09 | 3 | .02 | ? | ? | |
| | 1966 | 14,670 | Y(rt)** | ? | ? | 0 | .00 | 8 | .05 | ? | ? | |
| | 1967 | 20,000 | LP* | ? | ? | 19 | .09 | 3 | .01 | ? | ? | |
| | 1967 | 20,000 | Y(lt)** | ? | ? | 0 | .00 | 2 | .01 | ? | ? | |
| | 1967 | 410,730 | None | ? | ? | 2,588 | .63 | 856 | .21 | ? | ? | |
| Total | 1966-67 | 480,000 | | 740 | .15 | 2,620 | .55 | 874 | .18 | 4,234 | .88 | 1: |
| 1966 | 1968 | 50,000 | LV* | 54 | .02 | 348 | .70 | 14 | .03 | 416 | .83 | |
| | 1968 | 50,000 | Y(rt)** | 0 | .00 | 97 | .19 | 7 | .01 | 104 | .20 | |
| | 1968 | 1,360,000 | None | 989 | .07 | 5,115 | .38 | 343 | .03 | 6,447 | .48 | |
| Total | 1968 | 1,460,000 | | 1,043 | .07 | 5,560 | .38 | 364 | .02 | 7,003 | .48 | 2( |
| 1967 | 1969 | 25,000 | LV* | 48 | .19 | 205 | .82 | 29 | .10 | 272 | 1.08 | |
| | 1969 | 25,000 | R(rt)** | 1 | .01 | 88 | .35 | 8 | .03 | 98 | .40 | |
| | 1969 | 25,000 | R**LV* | 27 | .11 | 85 | .34 | 5 | .02 | 117 | .47 | |
| | 1969 | 825,000 | None | 811 | .10 | 2,614 | .32 | 1,502 | .18 | 4,927 | .60 | |
| Total | 1969 | 900,000 | | 887 | .10 | 2,992 | .33 | 1,544 | .17 | 5,416 | .60 | 1( |
| 1968 | 1970 | 25,000 | LV* | 5 | .02 | 43 | .17 | 4 | .01 | 52 | .21 | |
| | 1970 | 25,000 | R(lt)** | 3 | .01 | 21 | .08 | 4 | .01 | 28 | .10 | |
| | 1970 | 25,000 | R**LV* | 0 | .00 | 6 | .02 | 0 | .00 | 6 | .02 | |
| | 1970 | 3,097,000 | None | 1,746 | .06 | 10,686 | .35 | 4,395 | .14 | 16,827 | .54 | |
| Total | 1970 | 3,172,000 | | 1,754 | .06 | 10,766 | .34 | 4,403 | .14 | 16,923 | .53 | 1( |
| 1969 | 1971 | 48,500 | R(lt)** | 12 | .02 | 177 | .36 | 6 | .01 | 195 | .40 | |
| | 1971 | 102,000 | R(rt)** | 27 | .03 | 119 | .12 | 15 | .01 | 161 | .16 | |
| | 1971 | 99,000 | R(lt)** | 19 | .02 | 212 | .21 | 11 | .01 | 242 | .24 | |
| | 1971 | 2,469,200 | None | 885 | .03 | 12,146 | .49 | 1,727 | .07 | 14,758 | .60 | |
| Total | 1971 | 2,718,700 | | 943 | .03 | 12,654 | .47 | 1,759 | .06 | 15,356 | .56 | 1: |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1979 | 1981 | 147,441 | Ad-CWT* | (1982) | - | (1983) | - | (1984) | - | - | - | |
| | 1981 | 2,372,604 | None | (1982) | - | (1983) | - | (1984) | - | - | - | |
| Total | 1981 | 2,520,045 | | (1982) | - | (1983) | - | (1984) | - | - | - | - |

* LF,RF,LV,RV,Ad-$\frac{1}{2}$An, signify left or right pectoral fins clipped, left or right ventral fins clipped, adipose and $\frac{1}{2}$ of the anal fin clipped, adipose and anal fins clipped. Ad-CWT signifie that the adipose fin was clipped and a coded wire tag was implanted in the snout of the fish.

** Y,R,N, signify the letter brand placed on either the left or right side of the fish.

*** One jack returned with a adipose clip, coded wire tag, and a R brand on the right side.

Summary of Eggs, Fingerlings, and Smolts Planted From Rapid River Hatchery, 1964 - 1981

1964 Brood:
887,000 eggs taken. No eggs, fingerlings, or smolts planted or transferred.
580,000 smolts released into Rapid River, 1966.

1965 Brood:
604,000 eggs taken. No eggs, fingerlings, or smolts planted or transferred.
480,000 smolts released into Rapid River, 1967.

1966 Brood:
2,296,000 eggs taken. No eggs, fingerlings, or smolts planted or transferred.
1,460,000 smolts released into Rapid River, 1968.

1967 Brood:
2,055,000 eggs taken. No eggs, fingerlings, or smolts planted or transferred.
900,000 smolts released into Rapid River, 1969.

1968 Brood:
6,940,000 eggs taken.
757,376 eyed eggs shipped to Clearwater River drainage hatching channels.
No fingerlings or smolts planted or transferred. Nearly 2,000,000 smolt sized fish were lost to Kidney Disease in early 1970.
3,132,000 smolts released into Rapid River, 1970.

1969 Brood:
5,171,697 eggs taken.
497,000 eyed eggs shipped to Dworshak Nat'l Hatchery to start Kooskia Nat'l Hatchery.
4,300,000 eggs kept at Rapid River.

No fingerlings planted or transferred, 1970.
2,718,720 smolts released into Rapid River, 1971.

1970 Brood:
14,560,280 eggs taken.
4,417,424 green eggs shipped to Manchester Eyeing Station for Clearwater reintroduction
2,224,119 green eggs shipped to Kooskia Nat'l Hatchery.
526,516 green eggs shipped to Hayden Creek Hatchery.
2,473,983 eyed eggs shipped to Clearwater River drainage hatching channels.
9,642,072 eggs shipped.
4,607,736 eggs kept at Rapid River.

Fingerling plants, 1971.
200,520 planted in the Lemhi River.
353,970 planted in Decker Pond.
100,000 transferred to Sandpoint Hatchery.
654,584 fingerlings planted or transferred.

51,968 planted in Lochsa River.
2,808,200 released into Rapid River.

1971 brood: 6,038,785 eggs taken.
600,496 eyed eggs shipped to Hayden Creek Hatchery.
600,496 eggs shipped.
5,438,289 eggs kept at Rapid River

Fingerling plants, 1972.
53,562 planted in the Lemhi River.
104,300 planted in Red River.
29,800 planted in Ten Mile Creek (Clearwater).
44,700 planted in American River.
14,900 planted in Papoose Creek.
59,600 planted in Brushy Fork.
44,700 planted in Fish Creek.
14,900 planted in Post Office Creek.
44,700 planted in Squaw Creek (Lochsa).
61,500 planted in Lochsa River.
60,000 planted in Ten Mile Creek (Clearwater).
200,880 transferred to Sandpoint Hatchery.
174,200 transferred to Decker Pond.
74,700 transferred to Decker Pond.
172,305 transferred to Decker Pond.
1,134,817 total fingerlings planted or transferred.

Smolt Plants, 1973.
197,303 planted in the South Fork of the Clearwater River drainage.
2,908,425 released into Rapid River.

1972 brood: 15,072,604 eggs taken.
5,256,662 green eggs shipped to Sweetwater Eyeing Station (Clearwater reintroduction)
1,881,024 green eggs shipped to Hayden Creek Hatchery.
1,131,334 eyed eggs shipped to Hayden Creek Hatchery.
1,293,592 eyed eggs shipped to Red River Hatching Channel.
9,562,612 total eggs shipped.
4,878,017 eggs kept at Rapid River.

Fingerling plants, 1973. None.
Smolt plants, 1974. None
2,707,917 released into Rapid River.

1973 Brood: 13,510,464 eggs taken.
3,915,900 green eggs shipped to Sweetwater Eyeing Station. (Clearwater reintroduction).
1,295,424 green eggs shipped to Hayden Creek Hatchery.
104,760 green eggs shipped to Hagerman Hatchery.
502,200 eyed eggs shipped to Crooked River Hatching Channel.
702,000 eyed eggs shipped to Kooskia Nat'l Hatchery.
806,400 eyed eggs shipped to Hayden Creek Hatchery.
504,000 eyed eggs shipped to Minnesota for Walleye trade.
7,830,684 total eggs shipped.
5,302,677 eggs kept at Rapid River.

Fingerling plants, 1974.
210,734 transferred to Sandpoint Hatchery.
206,360 transferred to Kooskia Nat'l Hatchery
36,400 planted in Ten Mile Creek.
52,080 planted in Ten Mile Creek.
18,200 planted in Newsome Creek.
633,000 planted in the Lemhi River.
10,428 planted in Carehorn Creek.
1,167,202 total fingerlings planted or transferred.

Smolt plants, 1975
117,000 planted in the S.F. of the Clearwater River.
3,373,700 released into Rapid River.

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1974 Brood: 6,890,196 eggs taken.
809,400 eyed eggs shipped to Hayden Creek Hatchery.
407,012 eyed eggs shipped to Indian Creek Hatching Channel.
1,216,412 total eggs shipped.
5,203,276 eggs kept at Rapid River.

Fingerling plants, 1975.
203,500 transferred to Sandpoint Hatchery.
21,840 planted in Carehorn Creek.
59,962 planted in Red River.
30,750 planted in Newsome Creek.
10,250 planted in Ten Mile Creek.
1,140,300 planted in the Lemhi River.
1,466,602 fingerlings planted or transferred.

Smolt plants, 1976.
205,700 planted in the S.F. Clearwater drainage.
3,564,040 released into Rapid River.

1975 Brood: 8,503,686 eggs taken.
2,363,200 green eggs shipped to Sweetwater Eyeing Station (Clearwater reintroductio
252,200 eyed eggs shipped to Mullan Hatchery.
255,000 eyed eggs shipped to Hayden Creek Hatchery.
280,659 eyed eggs shipped to Indian Creek Hatching Channel.
3,151,059 eggs shipped
4,906,492 kept at Rapid River.

Fingerling plants, 1976.
34,000 planted in Ten Mile Creek.
156,000 planted in the Lemhi River.
65,960 planted in the S.F. of the Clearwater River.
206,400 planted in Decker Pond.
206,400 planted in Decker Pond.
209,960 Transferred to Sandpoint Hatchery.
36,143 planted in Bear Valley Creek (upper Hayden Creek drainage).
914,863 total fingerlings planted or transferred.

Smolt plants, 1977.
249,750 planted in the S.F. of the Clearwater drainage.
2,170,922 released into Rapid River.

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1976 Brood: 11,492,878 eggs taken.
1,161,600 green eggs shipped to Mullan Hatchery.
2,937,994 green eggs shipped to Sweetwater Eyeing Station (Clearwater reintroduction
261,960 eyed eggs to Hayden Creek Hatchery.
261,000 eyed eggs to Sandpoint Hatchery.
1,267,208 eyed eggs shipped to Mackay Hatchery.
6,389,610 total eggs shipped.
5,009,482 kept at Rapid River.

Fingerling plants, 1977.
47,008 shipped to the University of Idaho, Fisheries Co-op Unit.
311,850 shipped to Mackay Hatchery.
104,500 planted in Lolo Creek.
501,000 transferred to Red River Pond.
80,000 planted in the S.F. of the Clearwater drainage.
1,045,358 fingerlings transferred or planted.

Smolt plants, 1978.
None planted
2,413,678 released into Rapid River.

1977 Brood:

| | |
|---|---|
| 14,160,330 | eggs taken. |
| 2,633,460 | green eggs shipped to Clearwater Eyeing Station (Clearwater reintroduction). |
| 2,287,800 | green eggs to Kooskia Natl Hatchery. |
| 2,439,000 | green eggs to Mullan Hatchery. |
| 250,200 | eyed eggs shipped to Mullan Hatchery. |
| 288,000 | eyed eggs shipped to Hayden Creek Hatchery. |
| 20,700 | eyed eggs shipped to the University of Idaho. |
| 1,007,340 | eyed eggs shipped to the Crooked River Hatching Channel. |
| 8,926,440 | total eggs shipped. |
| 5,098,587 | eggs kept at Rapid River. |

Fingerling plants, 1978.

| | |
|---|---|
| 723,000 | transferred to Mackay Hatchery. |
| 50,800 | transferred to Decker Pond. |
| 200,025 | transferred to Red River Pond. |
| 265,600 | planted in the Lemhi River |
| 1,239,425 | total fingerlings transferred or planted. |

Smolts planted, 1979.

| | |
|---|---|
| 44,373 | planted in Newsome Creek. |
| 156,362 | planted in White Sands Creek (Lochsa River). |
| 200,735 | total smolts planted |
| 3,018,448 | released into Rapid River. |

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1978 Brood:

| | |
|---|---|
| 10,026,888 | eggs taken. |
| 787,322 | green eggs shipped to Hayden Creek Hatchery. |
| 970,728 | green eggs shipped to Mackay Hatchery (500,000 eyed eggs to be shipped to Oregon). |
| 1,540,282 | green eggs shipped to Sweetwater Eyeing Station (Clearwater reintroduction). |
| 706,936 | green eggs shipped to Dworshak National Hatchery. |
| 38,160 | eyed eggs shipped to the University of Idaho. |
| 10,864 | eyed eggs shipped to the University of Idaho (Hayden Creek). |
| 1,250,010 | eyed eggs shipped to the Crooked River Hatching Channel. |
| 219,969 | eyed eggs shipped to Sweetwater Eyeing Station (Clearwater reintroduction). |
| 5,534,271 | total eggs shipped. |
| 4,219,846 | eggs kept at Rapid River Hatchery. |

Fingerling plants, 1979.

| | |
|---|---|
| 232,500 | transferred to Red River Pond. |
| 10,000 | planted in Tom Hill Creek. |
| 242,500 | total fingerlings transferred or planted. |

Smolts planted, 1980

| | |
|---|---|
| 157,440 | planted in White Sands Creek (Lochsa River). |
| 2,811,593 | released into Rapid River. |

1979 brood: 5,646,723 eggs taken.
806,400 eyed eggs shipped to Hagerman Hatchery.
330,800 eyed eggs shipped to Ennis National Hatchery.
1,137,280 total eggs shipped.
4,511,443 eggs kept at Rapid River.

Fingerling plants, 1980.
293,250 planted in Red River Pond.

Smolt plants, 1981.
1,001,700 planted in Snake River at Hells Canyon Dam.
2,375,715 released into Rapid River.
3,377,415 total smolts planted.

1980 brood: 1,756,827 eggs taken.
no eggs shipped.

Fingerling plants, 1981.
None.

Smolts on hand, September 30, 1981.
1,480,171 on hand.

1981 brood: 6,122,273 eggs taken.
608,381 eyed eggs shipped to Hagerman Hatchery.
[illegible] eyed eggs shipped to Mackay Hatchery (Oregon).
449,280 eyed eggs shipped to Ennis National Hatchery.
1,[illegible] total eggs shipped.
4,[illegible] eggs on hand at Rapid River.

Table 9. Weekly Arrival Numbers - 1981 Spring Chinook Returns

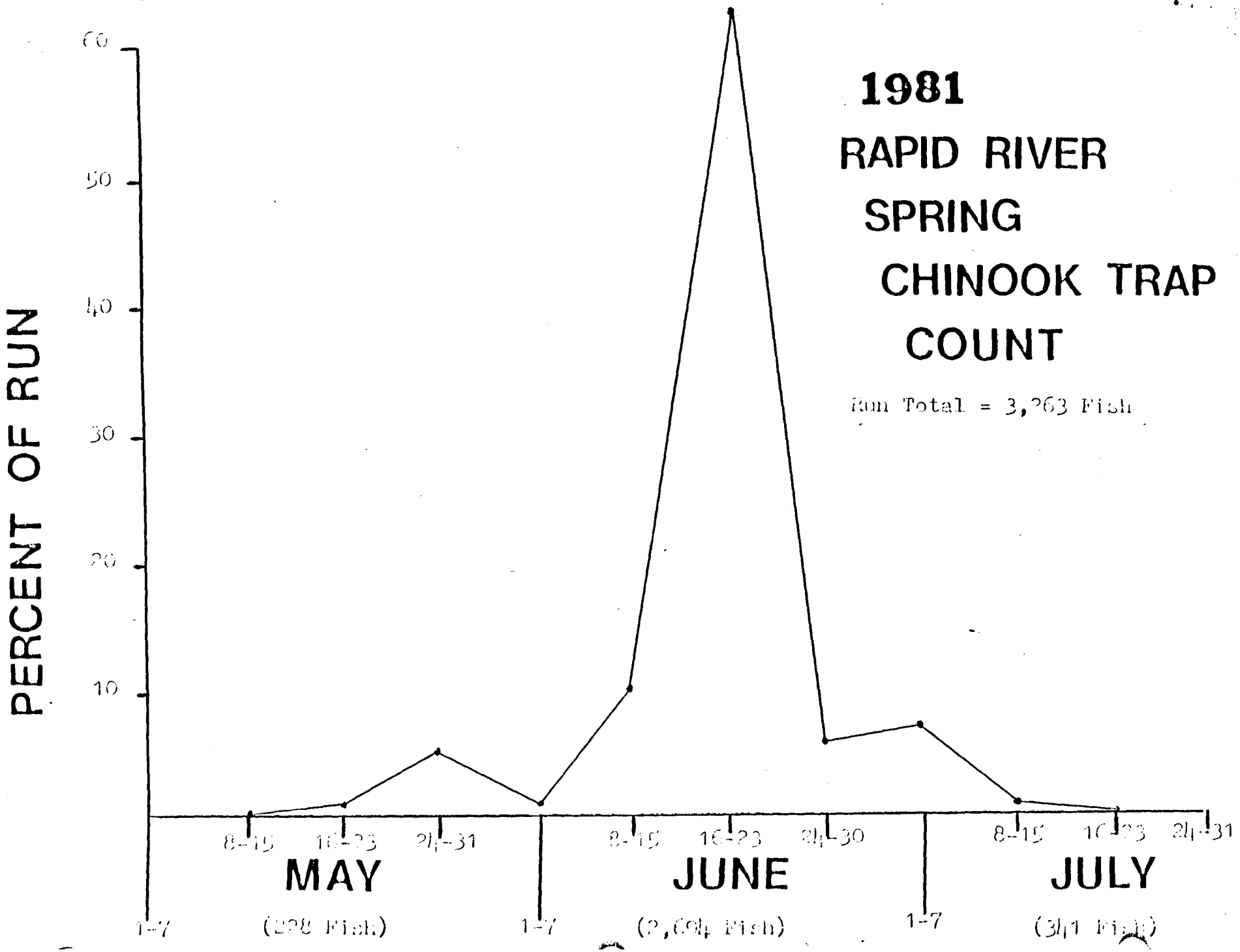

Table 10. Summary of coded wire tag data collected from Chinook returning to Rapid River Hatchery - 1981.

| Brood Year | Release Year | Length cm | Length in | No. Males | No. Females | Count at Unknown Length |
|---|---|---|---|---|---|---|
| 1976 | 1978 | 71.1 | 28 | 0 | 1 | 1 |
| | | 76.2 | 30 | 0 | 1 | 1 |
| | | 86.4 | 34 | 1 | 0 | 1 |
| | | 88.9 | 35 | 0 | 1 | 1 |
| Total | | | | 1 | 3 | 4 |
| 1977 | 1979 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Total | | | | 65 | 58 | 123 |

Total coded wire tagged fish collected at hatchery trap = 127

N)